

hour at 2.34 p. m. High southwest wind caused damage at Vicksburg, Miss. At Water Valley, Miss., a severe wind and rain storm, lasting 5 minutes, occurred 9 a. m.; frail buildings were blown down. A destructive storm occurred 6 miles southwest of Marksville, La., from 8.40 to 9.10 a. m.; buildings were damaged. At Memphis, Tenn., a thunderstorm prevailed from 5.15 to 10.40 a. m. The thunderstorm was followed by high wind which reached a velocity of 50 miles per hour at 1.05 p. m., and ended 5.30 p. m.

**17th-23d.**—A heavy rain storm prevailed over western Washington; streams overflowed their banks; bridges were carried away; and washouts occurred on the principal railroad lines.

**18th.**—High wind and rain prevailed over the New England and middle Atlantic states. At Strafford, Vt., buildings were blown down and unroofed. Frail buildings were blown down in Massachusetts and Connecticut. Trees were uprooted by wind at Rondout, N. Y. High wind, with snow, prevailed over the lower lakes. High wind and heavy rain caused some damage in New Jersey and Delaware. At Harrington, Del., a storm moved northeast at 12.25 p. m., destroying buildings, etc., in a path 150 to 200 feet in width. Heavy gales were encountered on Chesapeake Bay. At Baltimore, Md., the wind changed from southeast to northwest and reached a velocity of 42 miles per hour, causing considerable damage to buildings. At Norfolk, Va., a wind squall, with moderate rain, moved east, causing damage to the extent of about \$2,000. At Pysht, Wash., heavy rain and high northeast winds prevailed; streams were very high, and some damage was caused by flood. At Tatoosh Island, Wash., east winds reached a velocity of 60 miles per hour. On the 19th the wind shifted to south, with heavy rain. The ship "Ericsson," from San Francisco, was wrecked on Entrance Island, Vancouver Island.

**20th.**—A report from Seattle, Wash., stated that heavy rain had caused the overflow of streams in King, Pierce, and Snohomish counties, and that the floods were general throughout western Washington.

**23d.**—High winds prevailed over Nevada. At Carson City, Nev., a wind velocity of 42 miles per hour was reached in the early morning. A few buildings at Downeyville, Nev., were wrecked by high wind.

**24th.**—A storm of wind and snow, with low temperature, prevailed in the Northwest. At Omaha, Nebr., sleet rendered the streets almost impassable. At Salt Lake City, Utah, a west gale prevailed, and nearly eight inches of snow fell.

Damage to buildings was caused by high wind at Deseret, Utah. A northwest gale prevailed in the evening at Los Angeles, Cal.

**25th.**—A severe wind and snow storm continued in the Northwest. During a southeast gale a schooner was stranded near Milwaukee, Wis.; the crew was saved by the Life Saving Service; the cargo was lost.

**26-30th.**—Exceptionally severe and persistent wind and rain storms prevailed over the greater part of California. At Newcastle and Orangeville one-tenth and one-fourth, respectively, of the orange crop was reported blown from the trees. At Eureka, Cal., the storm set in with great violence the early morning of the 27th; heavy wind and rain squalls caused great damage in the surrounding country. At Blocksburg, Cal., 90 miles southeast of Eureka, the storm was very severe, with thunder and lightning, hail, rain, and snow; trees were blown down, and streams were flooded. At Red Bluff, Cal., southeast gales and rain from the 27th to 30th flooded streets.

At San Francisco, Cal., the storm continued from the 27th to the 30th, and on the 30th the wind reached a velocity of 56 miles per hour from the southeast, the highest velocity ever recorded at that station. At Sacramento, Cal., the wind reached a velocity of 45 miles per hour, with an extreme velocity of 54 miles on the 27th. At Portland, Oregon, a southwest gale, with rain, continued from the 27th to 29th. At Fresno, Cal., a gale and sandstorm prevailed from the 28th to 30th; trees and sheds were blown down. At Los Angeles, Cal., rain and high wind prevailed on the 28th; trees were prostrated, and cellars were flooded.

**27th.**—At Block Island, R. I., a heavy northeast gale began 5.50 a. m. and continued until the afternoon of the 30th; heavy rain fell; high tides occurred on the 29th and 30th; and the wind reached a velocity of 70 miles per hour on the 29th. At Detroit, Mich., heavy, moist snow damaged electric wires.

**28th.**—At Boston, Mass., a rain, sleet, and snow storm, with high wind, prevailed from the 28th to the 30th. At Rapid City, S. Dak., a "chinook" wind prevailed from the southwest from 4.30 p. m.

**29th.**—A gale, with snow, prevailed along the New England coast and over Long Island. The storm continued over Long Island Sound until the 30th, with wind shifting to northwest. On the 30th dredges were sunk off Newport, R. I., and a bark went ashore at Highland Light, Mass.

## INLAND NAVIGATION.

### FLOODS.

On the 10th the Tennessee River rose rapidly at Chattanooga, Tenn., causing considerable damage to dams, etc., of the United States Engineer Corps on the lower river. On the 11th the river continued to rise and navigation was resumed. On the 15th and 16th a freshet in the Raritan River caused considerable damage at New Brunswick, N. J.; a temporary bridge at the foot of Albany street was washed away. Meadows about Hoboken, N. J., were reported under water. Heavy rain from the 18th to the 20th flooded streams between the Cascade Mountains and Puget Sound, Wash. A number of towns were inundated, railroad traffic was interrupted by washouts and landslides, and several fatalities were reported. At Sacramento, Cal., the Sacramento River rose 10.8 feet from the 27th to the 30th.

### ICE IN RIVERS AND HARBORS.

*Mississippi River.*—At Saint Paul, Minn., the river was frozen on the 26th. At Red Wing, Minn., the river was full

of floating ice and navigation was practically closed for the season on the 21st; 23d, ice increased in quantity; 24th, river frozen over; 25th, Lake Pepin frozen and persons crossing on the ice; 27th, persons crossing on the ice from Wisconsin. At Dubuque, Iowa, the river was frozen and navigation closed for the season on the 25th. At Keokuk, Iowa, ice was running in the river and navigation was closed on the 23d.

*Missouri River.*—At Fort Buford, N. Dak., thin running ice was reported on the 16th; 21st, river full of ice; 24th, river closed by ice. At Bismarck, N. Dak., the river was frozen on the 21st. At Fort Stevenson, N. Dak., the river was frozen on the 24th. At Yule, N. Dak., the Little Missouri was closed on the 19th, and on the 21st the Little Missouri was closed by ice at Medora, N. Dak. At Pierre, S. Dak., the east channel was closed and the west channel was full of drift ice on the 21st. Saint Joseph, Mo., running ice was reported on the 24th; and at Oregon and Kansas City, Mo., floating ice was reported during the third decade of the month.

At Lock Haven, Pa., the Susquehanna River was frozen on the 25th and 26th. The Fox River was covered with thin ice, the first of the season, at Green Bay, Wis., on the 22d. The Illinois River was frozen at Ottawa, Ill., on the 22d, and at Hennepin, Ill., on the 23d. The Manitowoc River was closed by ice on the 20th. The Saint Croix River was frozen and persons were crossing on the ice at Osceola Mills, Wis., on the 22d.

Navigation on the Red River of the North was closed at Grand Forks, N. Dak., on the 8th. The Cheyenne River was frozen at Gallatin, N. Dak., on the 5th, and on the 8th persons were crossing on the ice at that place. The North Platte River was frozen at Saratoga, Wyo., on the 16th. The Black River was frozen at Port Huron, Mich., on the 23d. The first ice of the season was reported on the bay at Sandusky, Ohio, on the 4th. A report from Toledo, Ohio, dated the 23d stated that Maumee Bay was covered by a sheet of heavy ice. At Manistee, Mich., navigation was practically closed on the 30th. On the 27th navigation was obstructed by ice at the head of Sturgeon Bay, Wis.

#### STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence, and the monthly ranges:

*Heights of rivers above low-water mark Nov., 1892, (in feet and tenths).*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La. ....	29.9	14.6	18	7.6	1	7.0
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	7.9	4	1.9	27, 28	6.0
Little Rock, Ark. ....	23.0	11.0	6	6.5	25	4.5

#### Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Missouri River.</i>						
Fort Buford, N. Dak. *		5.3	9-15	3.8	21, 22	1.5
Bismarck, N. Dak. ....	14.0	— 0.1	5-7, 14, 15	— 0.6	20	0.5
Pierre, S. Dak. †	18.7	5.1	13, 16	4.5	9	0.6
Sioux City, Iowa ‡	18.0					
Omaha, Neb. ....	21.0	5.8	7	4.3	30	1.5
<i>Mississippi River.</i>						
Saint Paul, Minn. ....	14.0	2.1	1, 2	1.0	24	1.1
La Crosse, Wis. ....	11.8	2.8	30	0.9	25	1.9
Dubuque, Iowa ....	16.0	3.0	2	2.0	25	1.0
Davenport, Iowa ....	15.0	1.9	18	0.0	30	1.9
Keokuk, Iowa. ....	14.0	1.7	2	— 0.8	26	2.5
Hannibal, Mo. ....	17.0	2.3	2, 6	0.8	30	1.5
Saint Louis, Mo. ....	30.0	6.1	1	4.3	30	1.8
Cairo, Ill. ....	40.0	8.0	30	4.1	1	3.9
Memphis, Tenn. ....	33.0	4.7	28, 29	1.8	1, 2	2.9
Vicksburg, Miss. ....	41.0	2.6	30	— 0.1	1	2.7
New Orleans, La. ....	13.0	4.4	9	2.9	3, 5, 23	1.5
<i>Ohio River.</i>						
Parkersburg, W. Va. ....	38.0	6.2	23, 28	0.8	3	5.4
Cincinnati, Ohio. ....	45.0	9.2	27, 28	3.5	5, 6	5.7
Louisville, Ky. ....	24.0	5.1	29	2.3	7	2.8
<i>Cumberland River.</i>						
Nashville, Tenn. ....	40.0	7.5	30	— 0.1	1-3, 6	7.6
<i>Tennessee River.</i>						
Chattanooga, Tenn. ....	33.0	7.0	12, 13	1.1	1	5.9
Knoxville, Tenn. ....	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa. ....	29.0	7.5	21	5.4	27	2.1
<i>Savannah River.</i>						
Augusta, Ga. ....	32.0	11.1	11	5.9	2	5.2
<i>Willamette River.</i>						
Portland, Oregon. ....	15.0	6.4	25	0.5	2	5.9
<i>Susquehanna River.</i>						
Harrisburg, Pa. ....	17.0	3.6	23	0.5	1-8	3.1
<i>Alabama River.</i>						
Montgomery, Ala. ....	48.0	8.4	14	0.7	1	7.7
<i>James River.</i>						
Lynchburg, Va. ....	18.0	3.0	19	0.0	1-9	3.0

\* For 24 days.

† For 20 days.

‡ For 21 days.

§ For 25 days.

## ATMOSPHERIC ELECTRICITY.

### THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 14, on the 17th; in 10 on the 18th; in 8 on the 14th and 27th; in 7 on the 3d, 4th, and 26th; in 6 on the 1st, 5th, 6th, and 16th; in 5 on the 2d, 7th, and 15th; in 4 on the 8th; in 3 on the 9th, 10th, 19th, and 25th; in 2 on the 23d, 24th, and 28th; and in 1 on the 11th, 12th, 20th, 21st, and 22d. No thunderstorms were reported on the 13th, 29th, and 30th.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 13, in Mississippi; on 11 in Arkansas; on 10 in Missouri; on 9 in North Carolina; on 7 in Tennessee; on 6 in Alabama, Louisiana, and Texas; on 5 in Illinois, Kansas, New Jersey, and South Carolina; on 4 in Florida, Georgia, Oklahoma, Pennsylvania, and Virginia; on 3 in Indiana; on 2 in Indian Territory, Iowa, Kentucky, Michigan, and Montana; and on 1 in Connecticut, Maryland, New Hampshire, New York, Ohio, and Vermont.

West of the Rocky Mountains thunderstorms were reported in Arizona on the 1st and 29th; in California on the 23d and 27th to 30th; in Idaho on the 30th; and in Washington

on the 14th, 15th, and 29th. In states and territories other than those named no thunderstorms were reported.

### AURORAS.

Auroras were reported as follows: 2d, Blue Knob, Pa. 3d, Hudson, Wis. 4th, Washington, D. C.; Beverly, N. J.; Quakertown, Pa.; Madison, Medford, Shell Lake, and Valley Junction, Wis. 6th, Blue Knob, Pa.; Weston, Wis. 10th, Harvey, Wis. 11th, Payette, Idaho; Harvey, Wis. 12th, Alta, Iowa. 13th, Payette, Idaho; Frankfort, S. Dak. 17th, Orono, Me.; Gallatin, N. Dak. 18th, Springview, Nebr.; Gallatin, Grand Forks, Napoleon, and Wild Rice, N. Dak. 19th, Honeymead Brook, N. Y. 21st, Willows, Cal. 22d, Honeymead Brook, N. Y. 23d, Harvey and Medford, Wis. 24th, Newton, N. J. 25th, Meeker, Colo.; Gardiner, Me. 26th, Fall River, Mass.; Warrensburg, Mo. 27th, Crandon, Wis. 28th, Hastain, Mo.; Glendive, Mont.

At Washington, D. C., a brilliant aurora was observed from 7.40 to 8.10 p. m. of the 4th. The moon was full, and a few globo-cumulus clouds appeared. Streamers of a deep crimson color, having the appearance of an illumination by Bengal fire, were seen in the northeast. Streamers appeared in the northwest about 10 minutes after the display in the northeast had reached its maximum intensity. The display was notable in that auroras are seldom sufficiently intense in the latitude of Washington to be visible during moonlight.

## MISCELLANEOUS PHENOMENA.

### METEORS.

Except in parts of the Lake region, generally along the eastern slope of the Rocky Mountains, and over the northern plateau region, where clouds obscured the sky, meteoric

showers were observed over the entire United States the night of the 23d. The following are extracts from special reports received relative to the displays:

At Fall River, Mass., the meteors averaged 3 to 4 a minute